



User Manual

ePowerSwitch

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Conventions Used In This Guide

This guide uses these conventions:

Bold italic print, as shown in this example, indicates field names, menu items, or values in the ePowerSwitch software agent.

Bold print, as shown in this example, indicates filenames, directories, or items that you must type exactly as they appear.

Italic print words or letters in braces { } indicate values that you must supply. For example: *{drive}:\setup*

Italic print words or letters in brackets < > indicate keys to press. If two keys are separated by a + plus symbol, then the first key should be pressed and held down while pressing the second key. For example: *<alt+enter>*.

Note: **Notes contrast from the text to emphasize their importance.**

Warning: **These messages alert you to specific procedures or practices; serious consequences may result including injury if you disregard them.**

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The ePowerSwitch is a network-manageable, intelligent power control unit designed to provide control of power for up to eight electrical devices in Internet age.

ePowerSwitch Features

The ePowerSwitch System features:

- ?? **Internet ready** — Individually control each of eight outlets using a web browser, telnet, or a terminal program
- ?? **Remotely and individually reboot hung servers**
- ?? **If network hung, you can use telephone to control the ePowerSwitch to shutdown or reboot locked up devices or servers.**
- ?? **Sequentially apply power to equipment that is plugged into the ePowerSwitch.**
- ?? **Multiple OS support**—As long as there is Network Management software present.
- ?? **Remote setup support**— Once an IP address is assigned, the rest can be setup remotely through telnet commands.
- ?? **Easy USB port setup**—In addition to regular serial port setup support, this adapter also has a USB setup feature and is the preferred method for initial setup of this card. (Requires Windows 98)
- ?? **Remote Control**—Turns each receptacle on/off when the NMS sends the proper command.
- ?? **NMSs To Receive Alarms**—These traps (unsolicited messages) inform you about the power condition of the power outlets.

- ?? **Works with all major NMSs on Ethernet—**
ePowerSwitch System works with the most widely used Network Management Systems: HP Open View, Sun NetManager, IBM NetView, and many more.
- ?? **Remote Firmware upgrade support** - The **ePowerSwitch** System supports firmware upgrade through TFTP server remotely. A serial upgrade method is available too.
- ?? **Ring On or Reset adapter**

Status LEDs

– Three LED indicators:

Red LED – indicates the ON/OFF status for each of the rear output socket respectively from A to H

Green LED – indicates the Internet (remote) control or non Internet (front panel) control status of the corresponding socket. You may change this status by pressing and holding the button for **3 seconds** till the LED blinking then release the button.

Yellow LED – indicates the number of ePowerSwitch connected to NIC. The first one always has NIC built-in. The rest of the ePowerSwitch doesn't have NIC (device 2,3,4,...up to 16). They are connected through iLink port via iLink cable line.

Switch

Master Switch – controls the power for the entire unit.

On/Off Buttons – control for each of the corresponding rear socket. Press and hold for 3 seconds to setup up the Remote/local control for each of the corresponding rear socket. If you installed an optional NT card inside the ePowerSwitch, there is a delay time for the corresponding outlet of the NT card to off the power for the safe shutdown functionality. The default delay time is set up as 3 minutes.

RJ 11 Jacks

iLink Port – Daisy chain to the another ePowerSwitch client (without NIC).

Ring On/Reset Port – Connect to telephone line for telephone On/Reset control.









Communication Port – Native support on Microsoft NT 4 and 2000 UPS driver. All ports are functional default.

ePowerSwitch System Package

The standard ePowerSwitch System package contains an ePowerSwitch System Unit with supporting hardware and software.

ePowerSwitch System Package Contents

The components of your package are:

 ePowerSwitch System Unit
 One 3.5" Diskette
 User Manual
 NIC Web Card w/ USB Cable & RS232 Cable
 Phone Card
 NT Card w/ PC Communication Cable
 ePowerSwitch iLink Cable for Daisy Chain
 UPS iLink Cable

The ePowerSwitch System Unit

Figure 1 shows the internal ePowerSwitch's front panel. The network connection panel illustrates the following:



Figure 1 ePowerSwitch System Network Connection Panel

Network connection ports—ePowerSwitch System provides an unshielded twisted pair or UTP (RJ-45) connector

for 10Base-T networks. Once connected, it is possible to use the ARP command to set IP address through the network interface.

USB Connector – The USB port provides quicker setup compared to the serial setup process. The USB driver files and setup software are both included on the floppy. Users are encouraged to use USB setup. (Requires English version of Windows 98, either first or second edition)

Serial Port – The serial port on the front is designed for initial setup of the card. Null serial cable is required for serial setup.

Your package will also contain one 3.5” diskette and a USB cable.



One 3.5” Diskettes

Your package contains one 3.5” MIB diskette. The diskette contains a USB device driver, USB setup software, User’s manual, Quick installation and MIB file.

This section describes the IP set up & configuration of the ePowerSwitch System when you connect it to the network.

There are four different ways to setup ePowerSwitch.

1. Setup IP address via Ethernet port using the ARP command (first time only), then use a Web browser to setup all the parameters. This is the easiest way to setup.
2. Setup via serial RS232 port using terminal software, e.g. Windows HyperTerminal.
3. Setup via USB port using ePowerSwitch USBSetup software (USBSetup software included).
4. Setup IP address by using ARP command (first time only), then use telnet command to do the rest of the setup. The setup interface is the same as serial RS232 port setup.
5. Setup IP address via Ethernet cascaded cable.

1.Setup via Ethernet port

Before setup you need:

- 1. IP address:** Get a valid IP address from administrator.
- 2. MAC address:** Find **MAC address** on the **front panel of the Web Card.**
- 3. Default password: admin**

The following steps guide you in connecting the ePowerSwitch System through the Ethernet port

1. Connect the Ethernet port to the network with the Ethernet cable.
2. Using the following settings in the **text mode** :

```
c:\>arp -s 216.87.151.196 52-54-4c-19-ad-90
```

```
216.87.151.196 is the IP address  
52-54-4c-19-ad-90 is the MAC address.
```

Use ARP command to setup IP address only for the first time and the IP address is temporarily.

3. Use a **Web browser** to enter in and configure all ePowerSwitch network parameters with the IP address you setup by ARP command.

Use Web browser to set IP, gateway and subnet

1. Select “**Network**” in the SERVER category.
2. Fill out the blank and click “save” button.
3. Select “**Save&Restart**”, then click “Save and Restart” button to save network information into Web Card and reboot it.
4. Web Card needs about 30 seconds to reboot. Then IP setup procedure is done. ePowerSwitch works now.



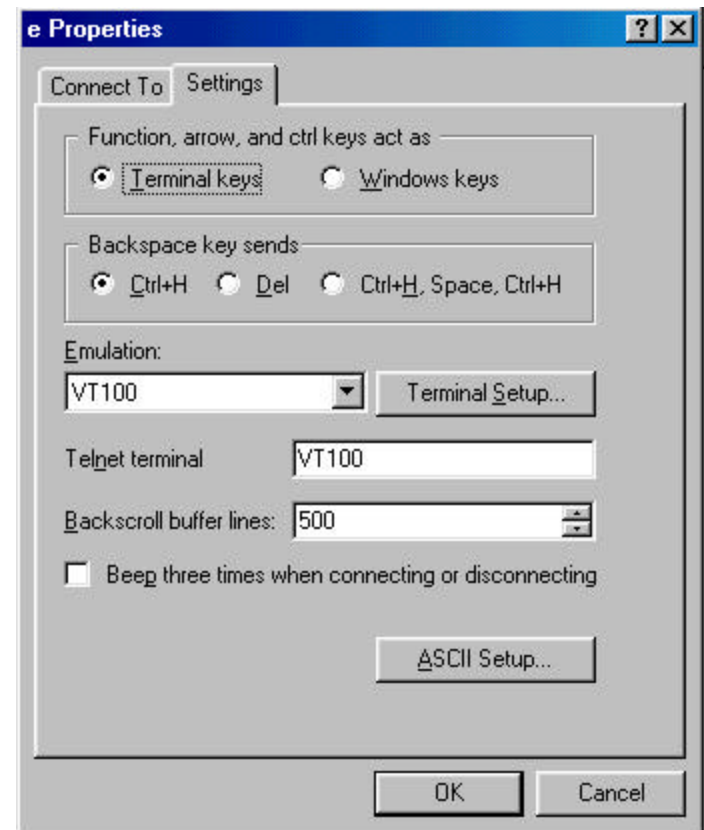
2. Setup via serial port

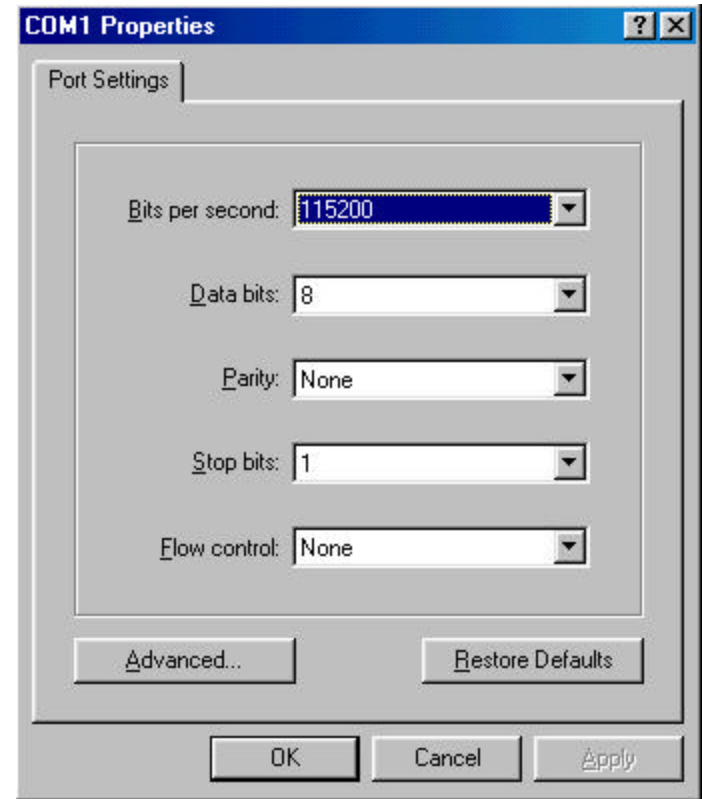
Before setup you need:

1. **IP address:** Get a valid IP address from administrator.
2. **RS232 Cable.(enclose)**
3. **Dumb terminal software:** ex: HyperTerminal in the win95/98, NT, Win2000.
4. **Default password: admin**

The following steps guide you in connecting the ePowerSwitch System through the serial port

1. Connect the RS232 port to a dumb terminal/PC with RS232 cable.
2. Setup terminal software
 1. Open terminal software; select “Property” in “File” category.
 2. Setup as following image.





3. Press **OK** if you have the Windows Communications screen or accept your communication settings in the terminal emulation package. The terminal/PC is now configured to communicate with the ePowerSwitch.
4. Approximately three seconds after you turn on AC power, the terminal displays "Check u-dram...". **Within 5 seconds, press "/"** when you see "Waiting five seconds..." to enter console configuration.

You are now ready to configure the ePowerSwitch. Refer to the following *Configuration* section for a more detailed discussion.

Note: **The telnet setup procedure is the same as the serial setup.**

When the configuration is completed, remember to save and restart.

Serial or Telnet Configuration

ePowerSwitch System is temporarily connected to a PC with a terminal emulation package or through telnet connection. The advantage of telnet configuration over serial port configuration is telnet operation can be done anytime, but serial configuration has a short five seconds login window when the NIC Web Card starts up.

Approximately three seconds after you turn on the power for ePowerSwitch, the NIC card displays “Check u-dram...” Press “/” when you see “Waiting five seconds...” to enter console configuration.

You are now ready to configure the ePowerSwitch.
Enter the user name and password.

Use CTRL-W to move up, CTRL-Z to move down. From this menu you can select to enter the IP address, Gateway address, and MIB system group; you can set trap receivers, display settings; reset the settings to default values; save the new values and exit the program, and exit without saving.

Use terminal to set IP, gateway and subnet

To set the IP address and Gateway address, select the first item.

```
-----
-> System          Set IP address, gateway address and subnet mask
   ISP             Set ISP dial no, ISP account password
   Mail            Set SMTP server, e-mail address
   Trap            Set trap receivers
   Device          Set device connect, UPS, ePowerSwitch
   Administrator   Set internet administrator name and password
   TelnetProfile   Set telnet configuration port and password
   Reset           Reset configuration to default
   Save_Restart    Save and Restart
   Exit            Exit and disconnection

Command > System <...more>
```

Figure 4 - IP Address for the ePowerSwitch System and More

```
-----
-> IP              Set IP address
   Gateway         Set gateway address
   NetMask         Set subnet mask
   DNS             Set domain name server

Command > IP <CR>_
```

NOTE: The minimum requirement to operate ePowerSwitch System is to set the IP address.

If you want to return to the *Main Menu*, press **Esc** key.

For more information on IP addresses and net masks, see the Reference section of the *Appendix* in this manual.

The ISP setup is for dial-up connection.

```
-----
-> DialNumber      Set ISP dial no
   Profile         Set ISP Account and password
   ActiveDial      Set enable/disable dial-out interface

Command > DialNumber <CR>
```



```
-----
-> SHTPServer      Set SHTP Server
   Add             Add a e-mail address
   Delete          Delete a e-mail address
-----
```

```
SHTP Server :
```

```
-----
No.           E-Mail Address
-----
```

```
(1) (Empty)
(2) (Empty)
(3) (Empty)
(4) (Empty)
(5) (Empty)
-----
```

```
Command > SHTPServer <CR>
```

To Save and Exit

If you are satisfied with your configurations, be sure to save them and exit.

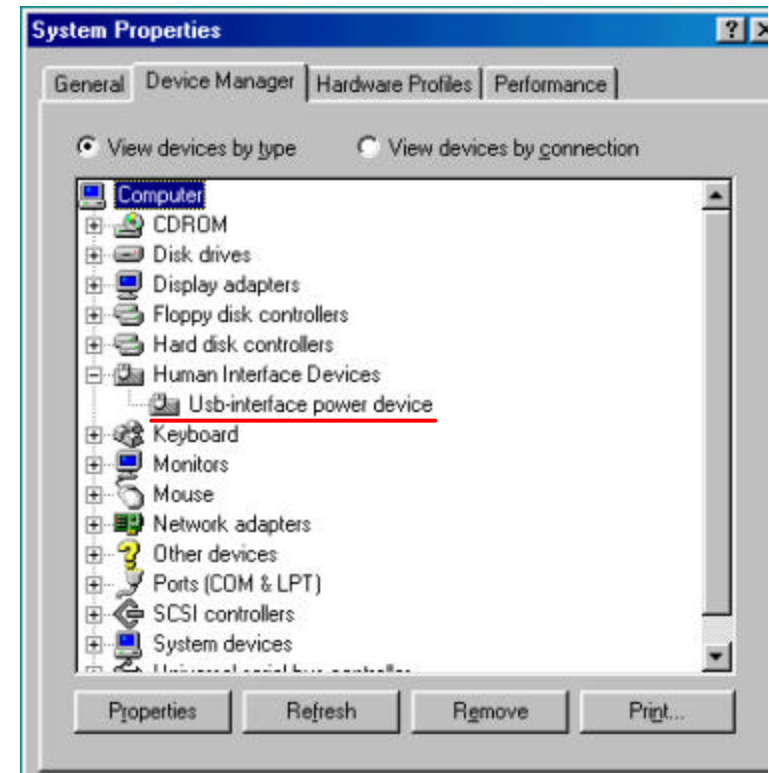
3. Setup via USB port

Before setup you need:

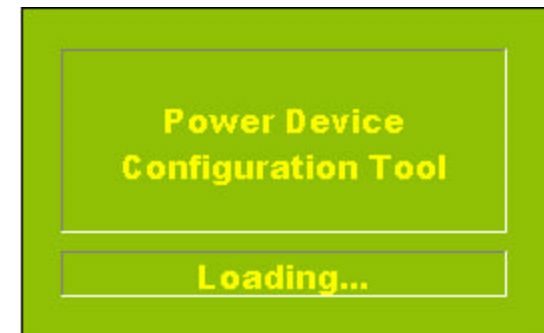
- 1. IP address:** Get a valid IP address from administrator.
- 2. USB Cable. (Enclose)**
- 3. USB driver and USBSetup file. (Enclose in the disk)**

1. Connect the ePowerSwitch to a Windows 98 PC through an USB cable. If the PC prompts for a new driver, insert the floppy provided. Uncheck update Windows 98 check box. It will copy the proper driver from the floppy. Follow the instructions. The new USB device will be recognized when the driver is properly installed. No system start up is required. See the picture below. Sometimes it takes longer

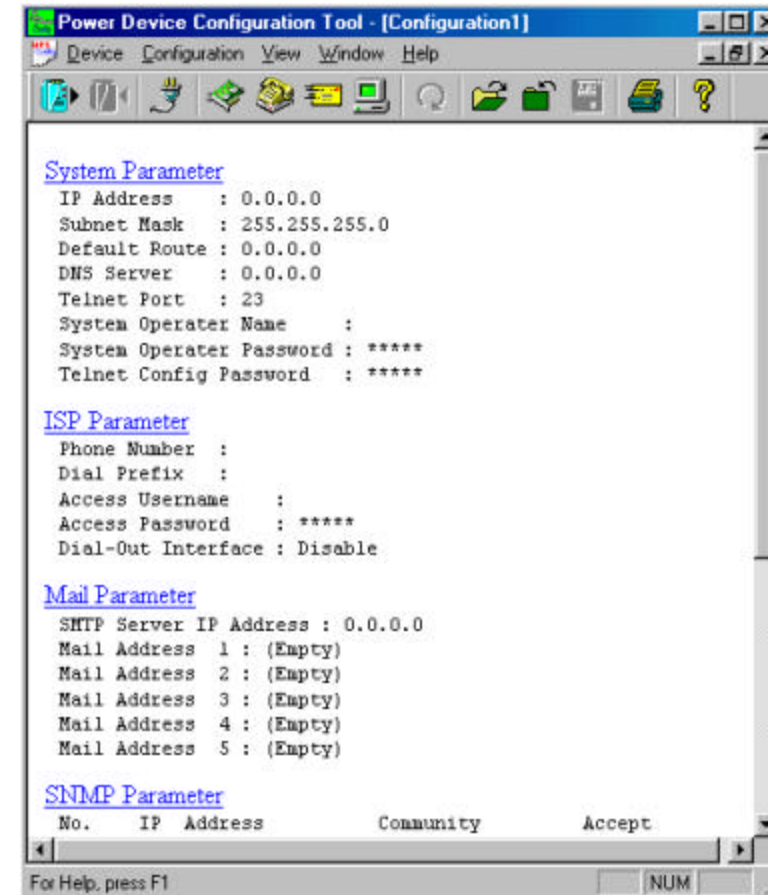
to see the device because the ePowerSwitch takes about 30 seconds to boot.



2. The “USB-interface power device” name must appear in the System Properties dialog box **before you run the USB setup software**.



3. USB setup is straightforward once the PC has successfully detected USB device. See the following figure.



You need to run Device | Update & Restart before closing

4. Telnet Options

You can also Telnet to the IP address of the ePowerSwitch System after it has been installed on your network. Once you have successfully established a Telnet connection with the

adapter you may access the configuration menu as if you were directly attached to it via the configuration port.

Moving cursor in telnet session is **tricky**. You need to select VT100 cursor which is under **Terminal | Preferences | VT100 Arrows**. After this setup, moving around menu system is actually easier than in console setup mode.

Note: You must have previously configured at least the IP address and router information locally in order to successfully make a Telnet connection.

5.Setup via Ethernet Cascaded Cable

Before setup you need:

1. **IP address:** Get a valid IP address from administrator.
2. **Ethernet Cascaded Cable. (Not Enclose)**

The following steps guide you in connecting the ePowerSwitch System through the Ethernet port

1. Assign your PC's IP address to dedicated IP address - 216.87.151.1
2. Connect the ePowerSwitch's Ethernet port and PC's network port with Ethernet cascaded cable.
3. Enter ePowerSwitch web default IP address- 216.87.151.196 by web browser, then Use Web browser to set IP, gateway and subnet.

PPP Configuration

PPP connection is useful if it is not possible to make a direct network connection to the ePowerSwitch. Again the external modem is needed to connect to the front serial port of the NIC Web card of the ePowerSwitch.

PPP Configuration	
ISP Dial Number	<input type="text"/>
ISP Account	<input type="text"/>
ISP Password	<input type="text"/>
<input type="checkbox"/> Enable Dial-up Function	
Modem Configuration	
Baudrate	<input type="text" value="115200"/>
Dial Prefix	Initialization String
<input type="text"/>	<input type="text" value="ATL1"/>
Mail Configuration	
SMTP Server	<input type="text"/>
Returned Address	<input type="text"/>
Message Subject	<input type="text" value="[ISP IP Address]"/>
Email Address	<input type="text"/>
	<input type="text"/>
	<input type="text"/>
	<input type="text"/>
<input type="button" value="Save"/> <input type="button" value="Disconnect Now"/>	

Fill in the blank as above in your web and save.

Remote operation procedure

1. The remote user may hang up after three rings when dial in.
2. Based on the content of the PPP configuration, **ePowerSwitch will then automatically dial up to the designated ISP and send the e-mail to the designated e-mail address with the assigned IP address from ISP.**
3. User may browse and control ePowerSwitch with this dynamic IP
4. Check the disconnection on the bottom of the PPP configuration page after work.

User Management

Administrators can assign the maximum of 4 users to control the outlet.

User Management									
ePowerSwitch 1 ▾									
User Name	Password	A	B	C	D	E	F	G	H
<input type="text"/>	<input type="password"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>	<input type="password"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>	<input type="password"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>	<input type="password"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Software Update

This is the place you can upgrade the firmware when it is available or bug fix.

Software Upgrade	
Current Version	V1.3
TFTP Server IP address	<input type="text"/>
File Name	<input type="text" value="device.bin"/>
Continue to proceed the software upgrade process, YES to upgrade now.	
<input type="button" value="YES"/> <input type="button" value="Reset"/>	
Back	

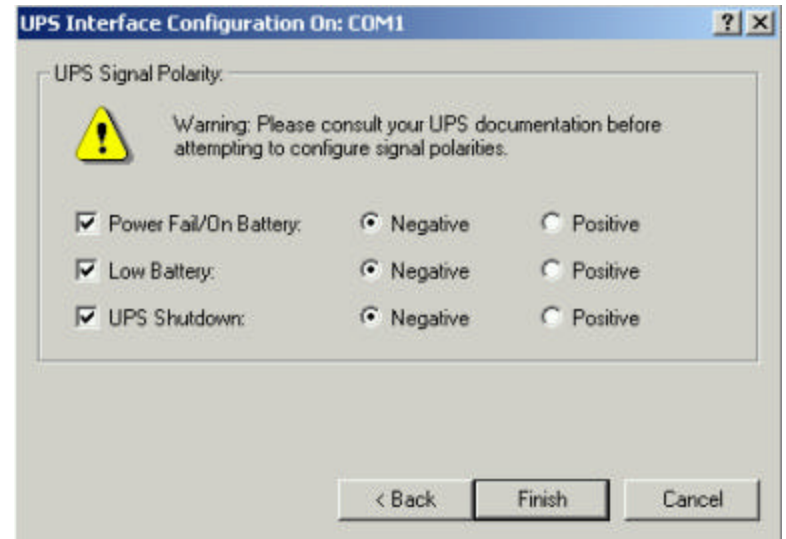
ePowerSwitch Configuration

Each outlet can be individually programmed to enable ring On/Off or reset. Power resume delay is convenient for sequential startup. Name of each outlet can be labeled to whatever you like it to be called. For example, server1, DSL modem, webserver1, etc. Since 16 ePowerSwitches can be daisy chained together to share one NIC, so each unit can be individually named. The last item “Enable waiting device shutdown” is dedicated to Microsoft Windows NT (4 and 2000, workstation and server) to have a safe shutdown. If you installed an optional NT card inside the ePowerSwitch, there is a delay time for the corresponding outlet of the NT card to off the power for the safe shutdown functionality. The default delay time is set up as 5 minutes.

ePowerSwitch Configuration					
ID Address Configuration		ePowerSwitch 1 ▾			
Identification		ePowerSwitch			
Outlet	Name	Power Resume Delay	Ring On/Reset	Safe Shutdown Reboot	
OutletA	OutletA	0001 sec	<input checked="" type="checkbox"/>	<input type="checkbox"/> / <input type="checkbox"/>	0300 sec
OutletB	OutletB	0002 sec	<input checked="" type="checkbox"/>	<input type="checkbox"/> / <input type="checkbox"/>	0300 sec
OutletC	OutletC	0003 sec	<input checked="" type="checkbox"/>	<input type="checkbox"/> / <input type="checkbox"/>	0300 sec
OutletD	OutletD	0004 sec	<input checked="" type="checkbox"/>	<input type="checkbox"/> / <input type="checkbox"/>	0300 sec
OutletE	OutletE	0005 sec	<input checked="" type="checkbox"/>	<input type="checkbox"/> / <input type="checkbox"/>	0300 sec
OutletF	OutletF	0006 sec	<input checked="" type="checkbox"/>	<input type="checkbox"/> / <input type="checkbox"/>	0300 sec
OutletG	OutletG	0007 sec	<input checked="" type="checkbox"/>	<input type="checkbox"/> / <input type="checkbox"/>	0300 sec
OutletH	OutletH	0008 sec	<input checked="" type="checkbox"/>	<input type="checkbox"/> / <input type="checkbox"/>	0300 sec

Save

To enable this safe shutdown function, in both NT and WIN 2000, you need to have three setting for the UPS to configure it.



Connect the communication port on the rear of ePowerSwitch to NT or WIN 2000 server with the PC Communication cable. Connect the corresponding outlet on the rear of ePowerSwitch to the NT or WIN 2000 server with the PC input power cord. Check the corresponding box of safe waiting device shutdown in ePowerSwitch configuration page to enable this function.

Scheduled shutdown

Scheduled shutdown can be accomplished here. Be careful with which outlet you are working.

OutletA

OutletA OutletB OutletC OutletD

OutletE OutletF OutletG OutletH

Date	Action	Shutdown Time (HH:MM)	Restart Time (HH:MM)
MON	<input type="checkbox"/> Enable	00:00	00:00
TUE	<input type="checkbox"/> Enable	00:00	00:00
WED	<input type="checkbox"/> Enable	00:00	00:00
THU	<input type="checkbox"/> Enable	00:00	00:00
FRI	<input checked="" type="checkbox"/> Enable	12:14	12:15
SAT	<input type="checkbox"/> Enable	00:00	00:00
SUN	<input type="checkbox"/> Enable	00:00	00:00

Save

Verify The ePowerSwitch Operation

1. After you complete all configuration settings and connect the ePowerSwitch System to the network, *check the LINK status*.

Power and Link lights should be on all the times. Collision light turns on occasionally.

2. PING the ePowerSwitch System. Issue a PING command from the NMS (Network Management Station).

a) If you do not get a response, check the card 's network connection and IP address.

3. Test the adapter with an NMS. Perform a “*get*” and a “*set.*”

a) If the get or set commands fail, check the ePowerSwitch System access controls. The manager must have read permission to execute a *get* command successfully and read/write permission to execute a *set* command successfully.

(See *Configuring the NMS* section for a detailed discussion.)

Your ePowerSwitch is now installed and completely functional.

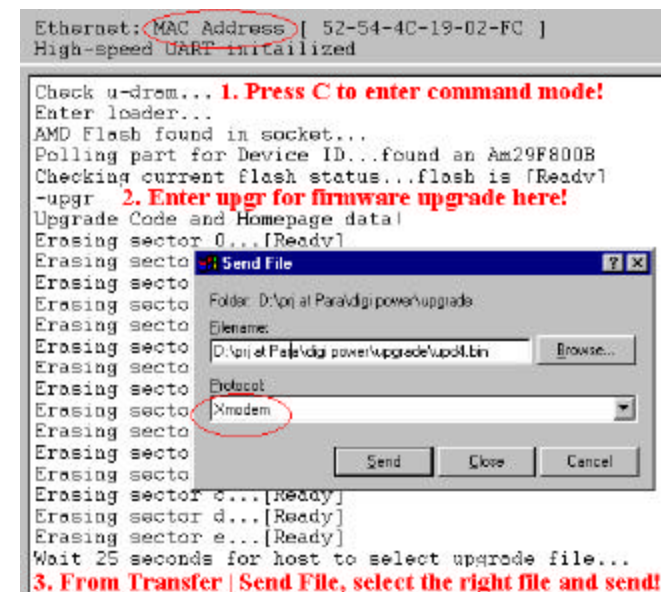
TFTP Upgrade

With a Web browser, click on “Software upgrade”, input TFTP server’s IP address and go. Make sure that the firmware file (For example: ups.bin) is located in the default directory of the TFTP server.

RS232 Serial Port Console Upgrade

The following steps guide you in connecting the ePowerSwitch System through the serial port

1. Connect the RS232 port to a dumb terminal/PC with a null serial cable.
2. Power on the NIC card of the ePowerSwitch;



? You have to reconfig all setting in ePowerSwitch after the upgrade process has been completed successfully because all

the user data are lost.

You must have the optional phone card installed inside the ePowerSwitch Server for all the functions discussed here. Please check the dealer for the detail information.

Telephone access interface

1. Dial up the ePowerSwitch.
2. After three sequence rings, the ePowerSwitch will respond by sending out 3 short beeps to the caller and waiting for user to enter password.
3. User enters access password. The default password is **123456789#**.
4. The ePowerSwitch will send out
 - a. 3 short beep to confirm successful login.
 - b. A long beep to deny access.
5. Once logged in, remote user can change ID Address:
333XXxx# is Change ID Address Command.
XX is Current Address, xx is Change ID Address.

Eg, 3330001# change ePowerSwitch ID from 0 to 1.

The default ID address for ePowerSwitch is 0.

The valid ID address for ePowerSwitch is 1, 2...16. The ID address set for ePowerSwitch in daisy chain needs to be different.

Note: If you had setup ePowerSwitch ID from by web, you do not need to change ID here.

6. Once logged in, remote user can punch in 4 digits

ePowerSwitch ID Address	ePowerSwitch Outlet	Function
XX	X	X
01-16	1-8 ↗ A-H	0-Off
	9 ↗ All	1-On
		2-Reset

Every command must add '#' in the end.

Eg, 0111# turn on ePowerSwitch01, outlet A,
 0120# turn off ePowerSwitch01, outlet B,
 0142# to reset ePowerSwitch01, outlet D (turn off
 immediately, and on **after 10 seconds**)

Remote user may punch in 8 digits to delay reset, on or off.

Eg,

02813600# means turn ePowerSwitch02 outlet H on after
 3600 minutes.

02803600# means turn ePowerSwitch02 outlet H off after
 3600 minutes.

02823600# means reset ePowerSwitch02 outlet H after
 3600 minutes.

Use combination of 0111XXXX# and 0112XXXX# to get
 different delay for reset, or create a longer command.

XXXX max value is 9999, which is about 166 hours, or
 6.94 days.

7. The ePowerSwitch will acknowledge received commands by issuing 2 short beeps otherwise a long beep indicate failure or not recognizable.
8. Change password. The default password is **123456789**. User has to enter previous password in order to change password.

9. User enter 888XXX....# or whatever previous password, then ePowerSwitch responds with three short beeps acknowledge access granted. Then user enter new password as following:
888XXXXXXXXXX#, and ePowerSwitch acknowledge 2 short beeps, sounds like “what?” and user input 888XXXXXXXXXX# the second time to re-confirm, and ePowerSwitch acknowledge 4 short beeps, indicating password change completed.
10. Hang up to close access.
11. Each command string should be entered within 20 seconds, the ePowerSwitch in a waiting loop to receive command. After 180 seconds without user input, the device will logout user.
12. “000#” key force to logout.
13. *” key cancel keyin error .
14. User interface use minutes as unit.

This appendix has three sections: *Reference*, *Glossary*, and *Troubleshooting*.

Reference

This section discusses Communities, IP Addresses, Sub net masking, and routers/gateways.

Communities

A community is a string of printable ASCII characters that identifies a user group with the same access privileges. For example, a common community name is “public.”

For security purposes, the SNMP agent validates requests before responding. The agent can be configured so that only trap managers that are members of a community can send requests and receive responses from a particular community. This prevents unauthorized managers from viewing or changing the configuration of a device.

IP Addresses

Every device on an internetwork must be assigned a unique IP (Internet Protocol) address. An IP address is a 32-bit value comprised of a network ID and a host ID. The network ID identifies the logical network to which a particular device belongs. The host ID identifies the particular device within the logical network. IP addresses distinguish devices on an internetwork from one another so that IP packets are properly transmitted.

IP addresses appear in dotted decimal (rather than in binary) notation. Dotted decimal notation divides the 32-bit value into four 8-bit groups, or octets, and separates each octet with a period. For example, 199.217.132.1 is an IP address in dotted decimal notation.

To accommodate networks of different sizes, the IP address has three divisions—Classes A for large, B for medium, and C for small. The difference among the network classes is the number of octets reserved for the network ID and the number of octets reserved for the host ID.

<i>Class</i>	<i>Value of First Octet</i>	<i>Network ID</i>	<i>Host ID</i>	<i>Number of Hosts</i>
<i>A</i>	<i>1-126</i>	<i>first octet</i>	<i>last three octets</i>	<i>16,387,064</i>
<i>B</i>	<i>128-191</i>	<i>first two octets</i>	<i>last two octets</i>	<i>64,516</i>
<i>C</i>	<i>192-223</i>	<i>first three octets</i>	<i>last octet</i>	<i>254</i>

Any value between 0 and 255 is valid as a host ID octet except for those values the InterNIC reserves for other purposes.

<i>Value</i>	<i>Purpose</i>
<i>0, 255</i>	<i>Subnet masking</i>
<i>127</i>	<i>Loopback testing and interprocess communication on local devices</i>
<i>224-254</i>	<i>IGMP multicast and other special protocols</i>

Subnetting and Subnet Masks

Subnetting divides a network address into subnetwork addresses to accommodate more than one physical network on a logical network.

For example: A Class B company has 100 LANs (Local Area Networks) with 100 to 200 nodes on each LAN. To classify the nodes by its LANs on one main network, this company

segments the network address into 100 subnetwork addresses. (If the Class B network address is 150.1.x.x, the address can be segmented further from 150.1.1.x through 150.1.100.x.)

A subnet mask is a 32-bit value that distinguishes the network ID from the host ID for different subnetworks on the same logical network. Like IP addresses, subnet masks consist of four octets in dotted decimal notation. You can use subnet masks to route and filter the transmission of IP packets among your subnetworks. The value “255” is assigned to octets that belong to the network ID, and the value “0” is assigned to octets that belong to the host ID.

For the example above, if you want all the devices on the subnetworks to receive each other’s IP packets, set the subnet mask to 255.255.0.0. If you want the devices on a single subnetwork only to receive IP packets from other devices on its own subnetwork, set the subnet mask to 255.255.255.0 for the devices on that subnetwork.

<i>Subnet Mask</i>	<i>Routing and Filtering</i>
<i>0.0.0.0</i>	<i>IP packets are transmitted to all devices.</i>
<i>255.0.0.0</i>	<i>IP packets are only transmitted to devices whose IP address’s first octet matches the sender’s IP address’s first octet.</i>
<i>255.255.0.0</i>	<i>IP packets are only transmitted to devices whose IP address’s first two octets match the sender’s IP address’s first two octets.</i>
<i>255.255.255.0</i>	<i>IP packets are only transmitted to devices whose IP address’s first three octets match the sender’s IP address’s</i>

	<i>first three octets.</i>
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Gateways

Gateway, also referred to as a router, is any computer with two or more network adapters connecting to different physical networks. Gateways allow for transmission of IP packets among networks on an internetwork.

Glossary

The Glossary section defines the terms used in the ePowerSwitch System -MP environment.

Agent	Implemented SNMP applications in network elements (hosts). Agents perform the network management's functions as requested by the network administrator from an NMS.
Dry Closure Input	Non-powered contact type inputs—switch, relay contact, open-collector.
Dry Closure Output	Form C dry-contact outputs which are common, normally open, or normally closed.
EtherNet	Local Area Network technology, originally developed by the Xerox Corporation, can link up to 1,024 nodes in a bus network. EtherNet provides raw data transfer in a rate of 10 megabits/sec. with actual throughputs in 2 to 3 megabits/sec. using a baseband (single-channel) communication technique. EtherNet uses carrier sense multiple access collision detection (CSMA/CD) that prevents network failures when two devices attempt to access the network at the same time. LAN hardware manufactures use EtherNet protocol; their products may not be compatible.
Gateway	A computer that attaches to a number of networks and routes packets between them. The packets can be different protocols at the higher levels.
IP	<i>Internet Protocol</i> —The TCP/IP standard protocol defines the IP datagram as the unit of information passed across a network.
IP Address	<i>Internet Protocol Address</i> —A 32-bit address assigned to hosts participating in a TCP/IP network. The IP address consists of network and host portions. It is assigned to an interconnection of a host to a physical network.
MAC	<i>Medium Access Control</i> —The network layer between the physical and the datalink layers. Specifically, the physical (hardware) address exists in this layer.
MIB	<i>Management Information Base</i> —The database, i.e., set of variables maintained by a gateway running SNMP.
NC	<i>Normally Closed</i> —Refers to a contact switch that is normally closed.
NIC	<i>Network Interface Controller</i> —The hardware interface to the physical connection to the network.
NMS	<i>Network Management Station</i>

NO	<i>Normally Open</i> —Refers to a contact switch that is normally open.
OID	<i>Object Identifier</i> —The variables defined in a MIB.
Personality	The current device specific software uploaded to the ePowerSwitch System
Router	A computer that manages traffic between different network segments or different network topologies. It directs the destination IP address. The network media can be different, but the higher level protocols must be the same.
RS-232	A specification for serial communication between data communication equipment and computers.
SNMP	<i>Simple Network Management Protocol</i> —A standard protocol used to monitor IP hosts, networks, and gateways. SNMP defines a set of simple operations that can be performed on the OIDs of the MIBs managed by the monitored Agents. It employs the UDP/IP transport layer to move its object between the Agents and the NMS.
Sub-Agent	A software module that manages specific MIB sub-groups for an Agent. They communicate with the Agent using a SMUX (multiplexer).
TCP/IP	<i>Transmission Control Protocol/Internet Protocol</i> —A protocol suite used by more than 15 million users with a UNIX association and widely used to link computers of different kinds.
TES	<i>Terminal Emulation Software</i> —Communications program to transform a personal computer into a terminal for the purpose of data communications.
TFTP Server	<i>Trivial File Transfer Protocol Server</i> —A host to provide services according to TFTP; a TCP/IP standard protocol for file transfer with minimal capability and overhead depending on UDP for its datagram delivery service.
UDP/IP	<i>User Datagram Protocol/Internet Protocol</i> —A TCP/IP standard protocol. It enables transfer of information between applications running on different host. It is referred to as an unreliable, connectionless datagram delivery service.
UPS	<i>Uninterruptible Power Supply</i> —A device that supplies power to your system with rechargeable batteries if there is an AC power failure.

Troubleshooting

Problem: The TES (Terminal Emulation Software) does not display anything.

Solution: *Make sure the TES's communication parameters are correct.* They should be 115200 baud rate, no parity, 8-data bits, and 1 stop bit.
The cable is a null serial cable.

PROBLEM: The NMS cannot ping the ePowerSwitch System.

Solution: *Make sure the network connection to the ePowerSwitch System is good.*

Solution: *Make sure the cable is in good condition.*

Solution: *Make sure to set the Community String*

Name the community with any lowercase name. (A UPS monitors a designated community.)

Solution *Make sure to set the Manager Table.*